

HEALTH PROTECTION IN A SHRINKING WORLD*

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Not long ago, I received a telephone call from a physician in Cleveland, Ohio, who had been referred to NCDC by his local health department. He thought he had a patient who had South African tick typhus fever. I replied that I would not know the difference between South African tick typhus fever and tsutsugamushi fever. He promptly told me that they were very similar.⁽¹⁾ The physician had been in the Navy in the South Pacific during World War II and had had opportunity to observe and manage tsutsugamushi fever. His patient had returned 10 days previously from a safari in Kenya and had developed lymphadenopathy, eschar, and fever.

If the Presidential Address of last year did not indicate to this group the shrinking nature of this world, certainly this story should.⁽²⁾ With today's transportation, with today's dispersion of people—military, Peace Corps, technicians, travelers—the “fortress mentality” that perpetuates stringent quarantine activities can no longer exist. The Public Health Service was established in 1798 to prevent the importation of pestilential disease from abroad. The Service still has that responsibility, but today this responsibility cannot be met by 1798 methods.

There is no single method which can protect this nation, or any nation, against the importation of disease. It must be a mix—a mix determined by the nature of the disease and the technologies available to control the disease. This includes surveillance at the border, surveillance in the interior, and global surveillance. It must also include programs that control and ultimately eradicate those diseases which are a threat to this and other countries. These activities must be carried out by the country seeking to protect itself and by the countries in which diseases are

occurring. The endeavor must have the involvement of international organizations and must be conducted on the basis of science rather than tradition.

The past 2½ years have seen a drastic overhaul of the quarantine procedures as practiced by this country, turning from traditional to scientific methods. Hopefully, at the next World Health Assembly in Boston in July 1969, the other nations of the world will join with the United States in modernizing concepts of quarantine by ratifying a major revision of the International Sanitary Regulations.⁽³⁾

The changes in the United States' practice of quarantine have been both programmatic and procedural.

The fact that Mexico has been free of smallpox since 1951 has finally been recognized by the United States of America. Therefore, the requirement that travelers from Mexico have a valid smallpox vaccination certificate has been removed. (Recently, Canada has adopted a similar position, and a person can now travel from the Yucatan to the Yukon without presenting his vaccination certificate.)

For countless years, travelers entering this country with an invalid vaccination certificate have been vaccinated at the port of entry regardless of where they have been. Quarantine inspectors are now following the first principle of good tropical medicine and asking passengers, “Where have you been?” If they have been in areas where there has been no smallpox, and have an invalid vaccination certificate, they are urged to see their private physician or their health department for vaccination. Only if the traveler has been in an area which is reporting smallpox within the past 14 days is he now vaccinated at port of entry.

To be alert to changing trends of disease occurrence across the globe, the statistics of the *Weekly Epidemiologic Record* of the World Health Organization have been computerized.⁽⁴⁾ This is not an accurate morbidity report, but does reflect changing trends and, hopefully, as

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countries see the benefits of this type of data sharing, reporting in itself will be improved.

As part of a professional-awareness program, an international counterpart of the *Morbidity and Mortality Weekly Report* has been instituted.⁽⁶⁾ Hopefully, this should help combat the tragic lag-time in recognition of imported disease—witness the soldier with plague undiagnosed for 11 days in a Dallas hospital⁽⁷⁾—witness the airman that died of malaria in a California hospital.⁽⁷⁾

And, finally, the antiquated block inspection characterized by an embarrassed quarantine inspector walking down the aisles of a dimly lit airplane, assuring himself that none of the disgruntled, tired passengers is incubating a loathsome disease, is no more.

The changes in the International Sanitary Regulations that are proposed are as much ones of attitude as they are of substance. There are substantive changes—typhus and louse-borne relapsing fever would no longer be diseases subject to quarantine. But, also, one of the recommendations of the Committee on International Quarantine was that its name be changed to that of the Committee on International Health Protection/Communicable Diseases. This is a significant change and is reflected in many other recommendations of the Committee.⁽⁸⁾

Member states are encouraged to call upon the Organization for assistance in investigating outbreaks of disease.

Surveillance is promoted as the best protection a country can have.

The Director-General is asked to take a more assertive position toward those countries which practice harsh and unnecessary measures of quarantine.

Part of a system of health protection is the eradication of disease that threatens a country. Currently, there is a most successful venture in international co-operation in disease prevention being conducted by 18 West African nations with the co-operation of the United States (USAID and NCDC) and the World Health Organization.⁽⁹⁾ The goal of this co-operative effort is the eradication of smallpox from West Africa, one of the four principal foci of smallpox in the world. To date, with less than 2 years into the program, 60 million people have been vaccinated—over half the target population.^(9,10) They

are being vaccinated despite the logistic and technical problems that defy the imagination of a person who has not experienced it.

But this is not just another mass vaccination program. This is a program that includes assessment, evaluation, and the development of a surveillance system, with a prompt, effective, reaction mechanism to suppress new occurrence of disease.

The press is full of the many so-called failures of foreign-aid programs, of the staggering cutbacks in appropriations, but here is a program of which this country can be justly proud, not only of its technical excellence, but from its many by-products.

In January of this year, a ceremony was held in Ghana commemorating the 25 millionth vaccination. The speakers in the football field in the village of Mampong were the Minister of Health of Ghana, the Surgeon General of the United States, the Minister of Health of Niger (a French-speaking country), the Secretaries-General of the French Organizations of West African States, and a representative of the World Health Organization. This coming together of the anglophone and francophone countries in itself is a triumph. But, then to hear representatives of these countries, one after another, in the World Health Assembly, stand up and make a plea for better communications on health matters between neighboring countries (when to send a cable from Lagos to Cotonou—a scant 2-hour drive—the route of the cable is from Lagos to London to Paris to Cotonou)—these events give rise to the hope that through a disease-eradication program, peripheral benefits of improved methods of living together can be achieved.

The bright, eager, intelligent, compassionate young physicians and operations personnel that have gone to work in Africa make an impression. There is one country in West Africa where the Chinese have made strong inroads. The representative from that country made a special point in open session of the World Health Assembly in May to praise the United States of America. The praise was not just for financial assistance to the Smallpox Eradication Program, but more specifically for the high caliber of the young U.S. technicians who are working with his people toward a common goal.

The benefits do not just accrue to the nations that are being assisted. Not only is the United States helping to protect itself by helping in the eradication of smallpox, but it is also indicating to these developing nations that the United States is a country that cares.

The preceding are events that have transpired. What follows is suggested for the future, but for the very near future.

At the present time, yellow-fever control activity in the Western Hemisphere is primarily *Aedes aegypti* eradication—in Africa, emergency control of epidemics—in South Asia, quarantine of individuals who do not have valid vaccination certificates and come from yellow-fever areas. The latter two approaches are acceptable for the technologies available and the conditions existent in Africa and Asia. However, has the time come for a review of the dependence on yellow-fever control through *A. aegypti* in the Western Hemisphere?

A. aegypti eradication was demonstrated at a time when there were urban epidemics of yellow fever with concurrent public concern.⁽¹²⁾

A. aegypti eradication was demonstrated at a time and in an area where the widespread use of artificial containers, such as the beer can, had not come about.

A. aegypti eradication was demonstrated at a time when vaccines had not been developed to the efficacy and safety they have today.⁽¹³⁾

A. aegypti eradication was demonstrated at a time when the jet injector for rapid immunization was unknown.⁽¹³⁾

A. aegypti eradication was demonstrated before the advent of chlorinated hydrocarbons and organic-phosphorus insecticides.⁽¹⁴⁾

A. aegypti eradication was developed before methods of rapid application of insecticides had been developed.⁽¹⁵⁾

Finally, it has been demonstrated that there are other mosquitoes that can transmit yellow fever.^(16, 17)

There has not been a challenge of the biological efficacy of *A. aegypti* eradication. Has there been documented sufficient import of viremic persons into an urban area where *A. aegypti* eradication has occurred to test whether other vectors cannot take the place of *A. aegypti* in the urban transmission cycle?

Can the concept of hemispheric eradication be

supported in the absence of global eradication? Did not *Anopheles gambiae* become established in Brazil in days when transportation was much slower and much less frequent? From whence came *gambiae*?⁽¹⁸⁾ That same coast of Africa that led to the introduction of *A. gambiae* into Brazil is heavily infested with *A. aegypti* and the scene of the most recent epidemic of yellow fever.⁽¹⁹⁾ Therefore, to be consistent with the concept of *A. aegypti* eradication as a primary means of controlling yellow fever, global eradication is necessary. But global eradication is not something that can be staged in one country and then another. It must be a simultaneous, total undertaking. Without simultaneous totality, reinfestations will be the rule rather than the exception. However, in 1968, can it be proposed to the developing countries of the world that they place a high priority on *A. aegypti* eradication in the absence of the immediate threat of disease? This would lead to major diversions of funds from other health programs and a drain of scarce managerial and scientific manpower. A country struggling to provide even the barest of basic health services cannot be expected to indulge in the luxury of *A. aegypti* eradication for the protection of other nations.

The technical discussions at the 21st World Health Assembly this past May in Geneva centered around the concept of surveillance. More attention must be paid to surveillance of yellow fever, its vectors, and its virus, particularly in the jungle phase. In other diseases for which there are not eradication methods, it is recognized that there will be an occasional case, but surveillance should be such that the initial case, or at least the first generation of cases, arising from an importation is recognized and the second prevented. The technology to accomplish this in the case of yellow fever is available with rapid, mass vaccination and vector control. If the punitive aspects of quarantine are dispelled, as the current revision of the International Sanitary Regulations hopes to do, countries should be willing to admit to the occurrence of the disease and take prompt action, soliciting assistance if they cannot cope with the situation themselves.

In a redirection of the methods to control yellow fever on a global basis, not only the practice of surveillance and prompt epidemic assistance must be strengthened, but both basic

and operational research need to be expanded. There are still many unanswered questions.

What is the density of *A. aegypti* necessary in an urban situation to support the transmission of the virus?

Can source reduction programs, as part of a generalized community sanitation program, so reduce the density of *A. aegypti* in the urban situation that additional efforts would be unnecessary?

Are there methods to control jungle yellow fever?

What are the potentials of biological and genetic control?

Global species eradication through mechanical and chemical means alone is doubtful. The development of insecticide resistance among *A. aegypti* has been documented, and there has been speculation about changing habits of the mosquito.⁽²⁰⁾ Man has not been too successful in eradicating other species. Those species which have been eradicated, such as the passenger pigeon, had a marginal ability to survive. The *A. aegypti*, on the other hand, shows an uncanny ability to adapt to new and changing environments.

This is not to deprecate the effort that has been expended to eradicate the mosquito from many parts of the world. Undoubtedly, this effort has prevented disease and, quite likely, epidemics. But change must not be resisted. The malaria-eradication effort has taken advantage of the introduction of new methods: From draining and larviciding to residual spraying, to mass drug therapy, and to multiple combinations thereof. And yet, today, the World Health Organization is willing to call for a reassessment of the strategy of malaria eradication.⁽²¹⁾ Now is the time for a reassessment of the strategy of yellow-fever control.

South African tick typhus fever will never become a major problem to the health of the United States, but malaria was a major problem to the airman who died, undiagnosed, in a hospital in California. You are but a small handful of people who serve the tropical medicine needs of this whole nation and, unfortunately, you don't look any younger than you did 2 years ago. There are organized governmental activities, such as those described, that can aid in protecting the nation against major exotic disease, but it is

upon the shoulders of you who teach to inculcate upon all students of medicine that in this shrinking world, one of the first questions that should be asked in the medical history is, "Where have you been?"

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